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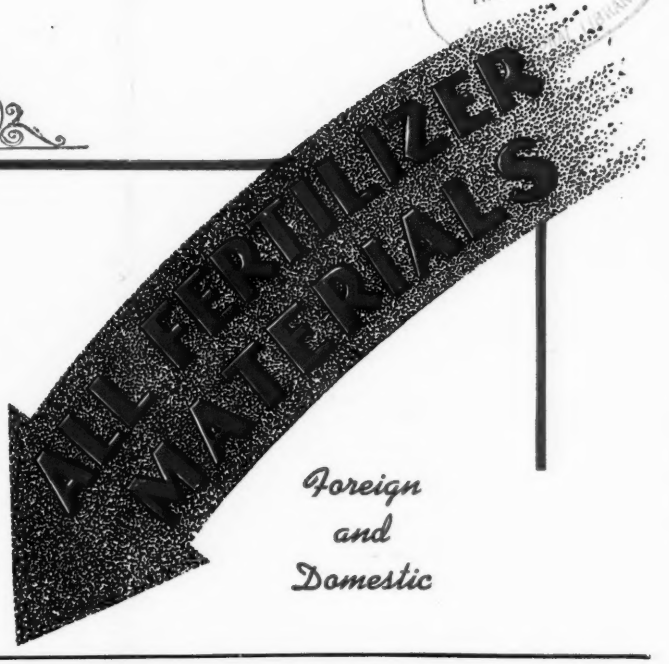

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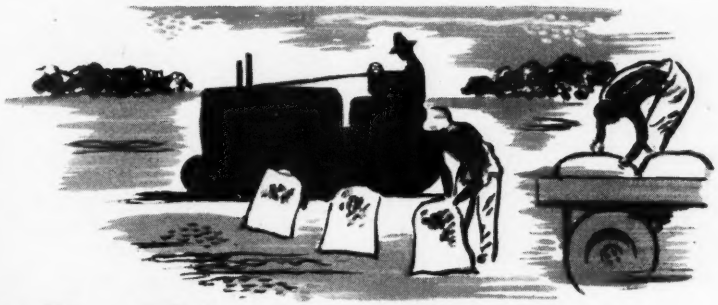

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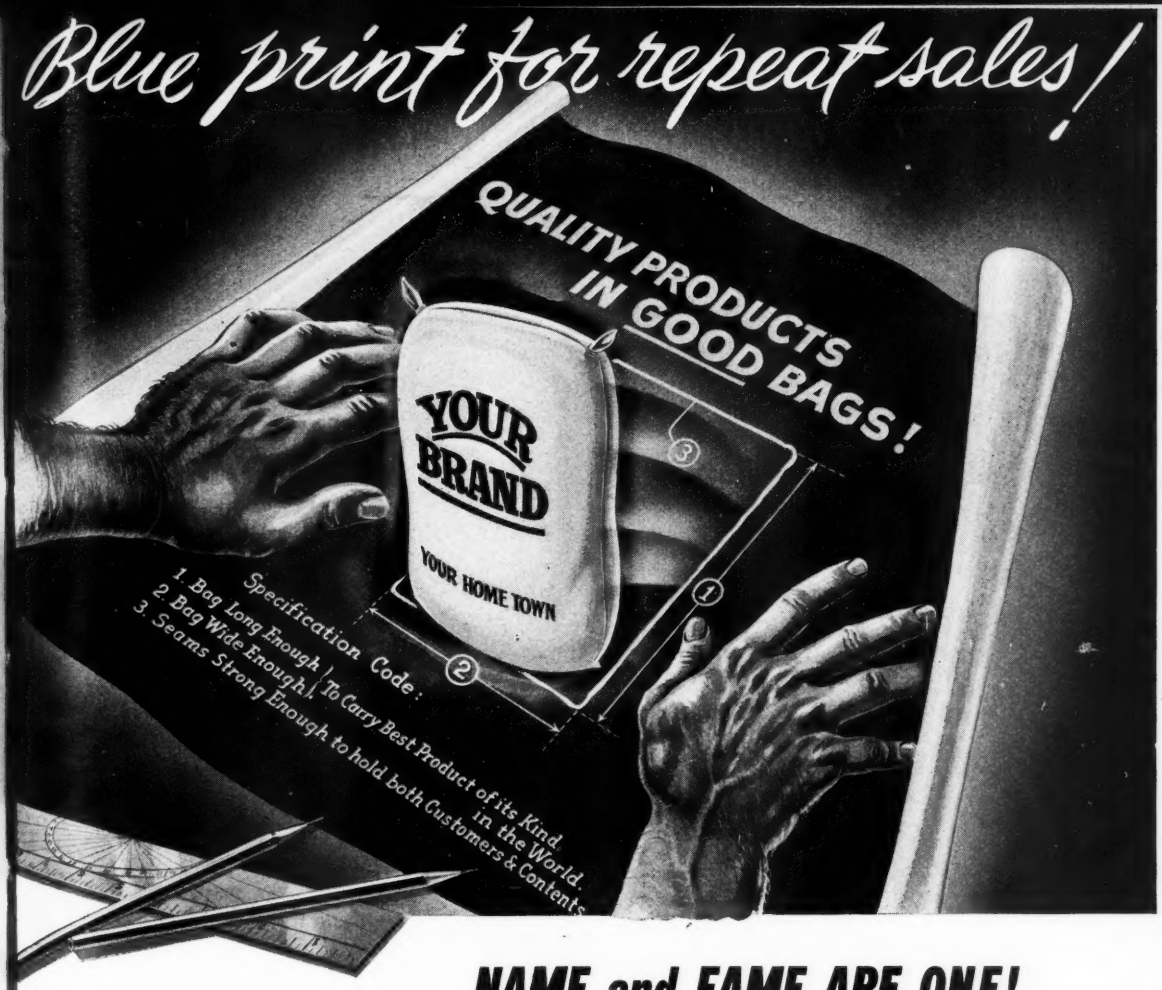
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AMERICAN FERTILIZER

"That man is a benefactor to his race who makes two blades of grass to grow where but one grew before."

Vol. 104 MARCH 23, 1946 No. 6

Hopewell Nitrogen for Peace, Protection and Prosperity

HOPEWELL Nitrogen has come back from war with an honorable discharge. Nitrogen fertilizers and chemicals are produced at Hopewell, Virginia, by The Solvay Process Company and distributed throughout the country by The Barrett Division of Allied Chemical and Dye Corporation.

Hopewell Nitrogen products, which were so essential in war, will be needed for peace, protection and prosperity. Nitrogen fertilizers will help the farmers produce better and larger crops. Ammonia products will be needed to help make automobiles, tractors, and airplanes, and the petroleum products to power and lubricate them. Nitrogen explosives will return to their normal peacetime work for mining, roadbuilding and farming. Lifesaving chemicals made with the aid of ammonia products will assist our doctors in making our world a healthier and happier place in which to live.

Nitrogen is a member of the family of more than 90 elements which make up the universe. It is found in plant and animal tissue, in the soil, in coal and peat and in the atmosphere. The largest source is the atmosphere; in fact, over every square mile of the earth's surface there are 22,000,000 tons of nitrogen.

In the atmosphere nitrogen is a gas and is of no use as a fertilizer or for most industrial purposes. To be useful in commerce, this nitrogen of the atmosphere must first be converted to such products as ammonia, nitrate of soda and ammonium nitrate. Natural nitrate of soda is extracted from natural deposits in Chile. Sulphate of ammonia, another important fertilizer material, is obtained from coal as a by-product in the manufacture of coke and gas.

Nitrogen is the "growth element" in fertilizers. It is estimated that, without fertilizers containing nitrogen and the other essential plant foods, phosphate and potash, American farmers would have to plow, plant, cultivate and harvest 50,000,000 additional acres of land, to obtain today's food crops.

Nitrogen is also necessary for most forms

The Hopewell, Virginia, Nitrogen Plant of the Solvay Process Company is the largest in America

of explosives. It supplies the "kick element" in TNT, guncotton, Amatol and the new powerful RDX and PETN, as well as the usual forms of industrial explosives. Industry uses nitrogen for many purposes and it has a significant role in the manufacture of metals, plastics and rubber; super-fuels and lubricants; and numerous lifesaving drugs and pharmaceuticals.

Nitrogen in America

Prior to World War I, the United States was entirely dependent on Chile for nitrate of soda and on Europe for most of its requirements of suphate of ammonia. As a matter of fact, all of the Allied nations looked to Chilean nitrate for nitrogen for military explosives. Germany would not have been able to wage a long war without a process, then newly developed by their chemists, for obtaining nitrogen from the air.

Dependence on Chile cost the Allies dearly. Prices for Chilean nitrate rose sky-high, while the operations of the German Navy made the supply extremely precarious. The great naval battle at the Falkland Islands, off the coast of South America, had to be fought and won to nullify the attempt by the Germans to blockade nitrate shipments from Chile to the Allies.

During this period, chemists and technicians throughout the world devoted intensive effort to the problem of nitrogen production. Foremost among them was the research organization which has since developed into the Solvay Nitrogen Laboratory. This group had, by the time the United States entered World War I, made greater advances in the art than any organization outside of Germany. It had perfected a laboratory process and was about to erect a plant for commercial production. However, at the request of the War Department, the organization placed at the disposal of the Government, for use in munitions manufacture at the Government's projected plant at Muscle Shoals, Alabama, both the process and entire personnel concerned with the development of the process.

Following the end of World War I, the organization continued its poineer development work, built America's first successful synthetic ammonia plant at Syracuse, N. Y., in 1921, and in 1927 commenced construction at Hopewell.

A Portion of the "A-N-L" Brand Fertilizer Plant

Along with plants constructed elsewhere, the completion of the Hopewell plant a year or so later made the United States independent of foreign nitrogen sources for the first time in its history. At the request of the Army Ordnance Department, Solvay undertook early in 1941 the construction and operation of an anhydrous ammonia plant for the Government at Henderson, Kentucky, and later an additional and larger plant at South Point, Ohio. In addition to being builder and operator, the Solvay organization acted as architect and engineer, trained the necessary personnel and loaned a large number of trained and experienced employees from the Hopewell plant.

In recognition of their contributions to the war effort, the men and women of the

Hopewell plant have geen awarded the Army-Navy E five times, the South Point plant three times, and the Henderson plant five times.

Now comes the tasks of peace. Outstanding among these for Barrett Nitrogen is to increase its help to the farmer.

Fertilizers for Farmers

Along with such basic products as anhydrous ammonia and chlorine, the Hopewell plant produces three types of nitrogen fertilizer materials: one, "Arcadian, the American Nitrate of Soda," for direct application and mixed fertilizers; two, "A-N-L" Brand Fertilizer Compound, and "Cal-Nitro" which contain long-lasting ammonia nitrogen, quickly available nitrate nitrogen, lime, and magnesia; and three, "Barrett Nitrogen Solutions" which are mixtures of ammonia and ammonium nitrate and are shipped in tank cars to fertilizer manufacturers for use in supplying the plant food nitrogen of complete fertilizers.

In addition to usual applications, the American farmer has found many interesting uses for Barrett nitrogen products. By fertilizing pastures he obtains more beef per acre, by fertilizing fish ponds he grows more fish per acre, and by fertilizing oyster beds he harvests more oysters per acre.

Metals, Plastics and Rubber

The ammonia family of chemicals, so necessary in the manufacture of iron, steel, plastics, rubber and many other products formerly used in huge quantities to make the guns, tanks, airplanes, ships and electronic devices for our armed forces, will continue to flow to American industry to help make the peacetime equivalents of those war machines.

Ammonia is used to recover copper, nickel, steel toughening vanadium and molybdenum and other metals. It is used in the nitriding process for hardening of steel, and in the manufacture of case hardening slats. Solvay ammonia also supplies the nitrogen

Barrett Nitrogen Supplies the "Growth Element" of Fertilizers

and hydrogen for bright annealing, and making metal powders from which intricate metal parts are molded.

Nitric acid made from Hopewell ammonia finds many uses in the metal industries; for example, pickling of stainless steel and etching and cleaning of copper and brass. Sodium nitrate, so valuable to the farmer as fertilizer, is used as component of molten salt baths for tempering, hardening, annealing and heat-coloring metal parts.

Large amounts of ammonia and chlorine are consumed in the manufacture of synthetic rubber, for example: in making catalysts; in recovery of butadiene; and in synthesizing raw materials and property modifying additives. Likewise, ammonia and chlorine enter into the production of plastics and rayon, and in processing of cotton and other agriculture fibres. Sodium nitrate and ammonium nitrate give special properties to glass.

Nitrogen products used in making explosives, war equipment, and super fuels will be needed by American industry to make peace-time products.

Professor Sir Alexander Fleming, discoverer of Penicillin. Hopewell sodium nitrate and ammonia are used in making this life-saving drug

Super Fuels and Lubricants

America is now in a position to utilize increasingly for peacetime purposes the tremendous wartime advances in petroleum technology.

During the war our mechanical equipment rolled on a film of oil and was powered by engines using super gasolines and fuel oils. The quantity and quality of petroleum products provided the margin of victory in many battles. Ammonia and its derivatives are essential in manufacture of super fuels and lubricants.

For example, ammonia moves directly to our oil fields and refineries where it is used directly to neutralize acids, prevent corrosion, and as a refrigeration agent. Ammonia, ammonium nitrate and chlorine are used in making catalysts for production of high-test gasoline.

In working at the extreme temperatures often encountered in the refining of oil, petroleum men have been faced with the problem of finding a stable liquid suitable for pumping heat from one red hot unit to another. Such a liquid now in general use is a molten mixture of nitrates and nitrates of potassium and sodium.

The performance of most petroleum products is vastly inproved through incorporation of relatively small quantities of chemical additives. The best known of this important class of products is ethyl fluid for high-octane gasoline. The important constituents of this fluid are tetraethyl lead, and organic compounds of chlorine and bromine, all of which require chlorine in their manufacture. A quick estimate indicates that at least a tank car of chlorine is needed to make the ethyl fluid for the gasoline required for the superforts to drop a thousand tons of bombs on Tokyo.

Less well known but equally important additives which require ammonia or chlorine for their manufacture include: gum inhibitors for high-test gasoline, materials to improve cetane rating of diesel fuels, compounding agents for extreme pressure lubricants, and

(Continued on page 28)

Fertilizer and Soil Conservation*

By A. B. BEAUMONT

State Conservationist, Soil Conservation Service, Amherst, Mass.

WHAT I shall say on this subject applies primarily to the New England states but it can be applied to most of the states of the Atlantic seaboard and to some extent to all sections having a humid climate. Soil conservation is the common meeting place of all agencies having to do with the improvement of soils and the production of bigger and better crops. The judicious use of commercial fertilizers is indispensable to a complete program of soil conservation. Soil conservation, soil improvement and soil fertility maintenance all require an adequate fertilizer program. New England farmers need to use much more fertilizer than they have ever used, and it will be to their advantage to do so.

With the exception of rather limited areas of soils derived from limestones and from glacial lake, marine and alluvial sediments, the soils of New England started their agricultural career with a pronounced handicap. Generous rainfall and coniferous forests over most of the area have produced true podzols or podzolic soils. Such soils are inherently low in basic elements necessary for the nutrition of crop plants, particularly calcium, potassium and magnesium; also low in nitrogen, phosphorus, and some rare elements, especially boron. Two hundred years of more or less exploitative farming have made a bad natural condition worse. New England farmers face a serious problem of soil restoration as well as one of soil conservation.

In New England may be found all the types of accelerated soil erosion that are found any where else. The types of physical erosion caused by water, wind, and ice are generally less extensive and less severe than are found in some other less favored sections of our country. Thse types are, nevertheless, serious and often critical in some areas. But there is one type of soil erosion found in New England which is as serious, or more so, as in any other section. I refer to chemical erosion or corrosion. This is the chemical or biological deterioration of soils by climatic chemical and biologic forces, and it is aided, abetted and accentuated by intensive cultural practices. Oxidation, hydration, solution and leaching of nutrient compounds present in organic matter and soil minerals, cause deterioration. These are natural processes which, when proceeding moderately, are beneficial, but when accelerated by man, become harmful.

New England soils are, with few exceptions, decidedly sandy and, therefore, easily become victims of chemical erosion. In Massachusetts only about 1 per cent of the mineral soils are in the heavy classes and about 25 per cent of medium texture. The remaining ones are light in texture. Organic matter rapidly declines in such soils when they are cultivated and end products of decay and decomposition quickly leach out. Lysimeter studies of the late Dr. M. F. Morgan of Connecticut show losses of nutrient elements per acre per year from unprotected sandy tobacco soils as follows:

Nitrogen	60 to 70 pounds
Potash	75 to 80 pounds
Lime	80 to 100 pounds
Magnesia	20 to 30 pounds
Phosphoric Acid	trace

In addition, the crop removes about 80 pounds of nitrogen, 115 pounds of potash, 90 pounds of lime, 15 pounds magnesia, and 20 pounds of phosphoric acid. The latter losses are, of course, unavoidable, but much of the loss through leaching can be prevented by the use of cover crops.

Organic matter is an important factor in the soil economy. It is not indispensable for the growth of crops but it has an ameliorating influence on soil conditions and plant development. It helps stabilize soils against forces of physical and chemical erosion, makes applied fertilizers more effective, improves biological conditions of the soil, promotes the decomposition of soil minerals, and itself supplies plant nutrients when it decomposes. Cover crops, crop residues and sod crops are important agents of soil conservation. Cash crop farmers of New England need to use more of these sources of organic matter for soil conservation and soil improvement. Dairy farmers can use more cover crops to advantage in corn culture, and they need to use

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*An address before the New England Fertilizer Conference, Amherst, Mass., February 12–13, 1946.

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Schedule for Nitrogen Fertilizers Being Maintained

With the exception of sulphate of ammonia and nitrogen solutions, productions of nitrogen supplies and imports are keeping approximately up to schedule, the Nitrogen Producers Industry Advisory Committee was informed by the Civilian Production Administration at a recent meeting with CPA and other government officials in Washington.

Production of sulphate of ammonia and solutions are somewhat below schedule because of the strike in the steel industry, but it was thought by industry members that production will be back to normal again by March 20. Industry members said that they estimate the loss in sulphate of ammonia production as a result of the strike at 124,000 tons, and described this as being an optimistic estimate.

Deliveries of nitrogen supplies of United States origin from July, 1945, through January, 1946, in terms of nitrogen, the CPA reported, totaled 310,600 tons against the goal of the 1945–46 program of 563,580 tons. Imports from Chile have amounted to 38,600 tons, against the goal of 104,000 tons. Imports from Canada amounted to 68,975 tons against the year's goal of 105,010 tons.

Nitrogen deliveries against the 1945–46 goal are shown in the following table:

	Tons Nitrogen — July '45 through Jan. '46 deliveries	Tons Nitrogen — 1945–46 program
U. S. Production—		
Ammonia sulphate	92,300	170,150
Solutions	94,200	170,000
Cal-nitro and uramon	16,400	28,530
Soda nitrate, synthetic and by-product	18,800	44,000
Ammonium nitrate—		
U. S. (32.5)	31,800	52,650
Ordnance (32.5)	39,600	68,250
Organic	17,500	30,000
Imports from Chile	38,600	104,000
Imports from Canada—		
Ammonia sulphate	16,200	24,600
Cyanamid	21,600	29,400
Ammo-phos 11–48	2,050	3,850
Ammo-phos 16–20	4,025	6,960
Ammonium nitrate (33.5)	25,100	40,200
Total U. S. supply	418,175	772,590
Less exports		73,472

During the meeting discussion also was had on the problem of nitrogen supplies for Germany and Japan. The opinion prevailed that there was little chance of meeting the requirements of these two countries from United States production.

Dr. A. R. Merz of the Chemicals Division of the Tariff Commission, who recently returned from an inspection of Japan, reported that there are 17 sulphate of ammonia plants in Japan but that production at this time is negligible because of destruction from bombing during the war, because they are otherwise in need of repairs, and because of general inertia.

Committee Urges Resumption of Potash Allocation

A proposal that primary potash salts be put back under allocation until present excessive demands are reduced to more normal levels has been placed before the Civilian Production Administration by members of the Potash Productions Industry Advisory Committee. The suggestion contemplates reestablishment of allocation delivery quotas by June 1, 1946. The recommendation was unanimously concurred in by members of the committee.

The decision to recommend allocation followed discussion of the critical worldwide shortage of potash and the adverse effect this may have in resuming normal agricultural production in devastated areas. It was pointed out that prewar exports from important supplying sources, such as France and Germany, are not in sight at the present time, and this country, while producing at record levels, faces a deficiency in supplying even domestic demand.

No indication was given by government officials at the meeting as to the final disposition of the recommendation. It was pointed out that several government agencies are concerned with the problem and the proposal will have to be studied by all of them before action is taken. It was indicated at the meeting that export set-asides will probably be required of the industry for meeting Western Hemisphere requirements.

Domestic Phosphate Demands Curtail Export Shipments

Problems facing United States producers of phosphate rock in meeting the unfilled quota of 58,000 tons of phosphate for Australia and New Zealand were discussed at a meeting in Washington by the Producers Industry Advisory Committee with the Civilian Production Administration.

Australia and New Zealand normally obtain their supplies of phosphate from the Nauru and Ocean islands, but they have been left in such a deplorable condition by the Japanese that it has become necessary for the Combined Food Board to schedule a part of the requirements from the United States. Nauru and Ocean islands normally shipped 1,400,000 tons of pure rock annually. It is not expected that shipments can be resumed from the islands before July and that only 200,000 tons will be available for the season of 1946–47. The meeting was told that it probably would take four years to get production and shipments back to normal.

The United States industry, however, it was pointed out, is facing extreme difficulties in meeting this country's unfilled quota of 58,000 tons because of production problems. The producers told the officials that it was impossible for them to increase production because of the shortage of equipment. It was also pointed out that while there appears to be sufficient boxcars to move the material the industry also was encountering difficulties in obtaining small boats for coastwise transportation.

Soil Tests Need Supplementing by Other Data

Soil tests by chemical means do not give all the answers. They must be supplemented with information as to the crops previously grown, plus history of the soil, or information on how well crops will respond to addition of plant-food fertilizers to the soil.

That is the conclusion reached by W. C. Sparks of the Colorado A. and M. College experiement station after experiments with potatoes in the San Luis Valley.

Soils of the valley always have shown high potassium content, Sparks explains. Yet potato yields increased 48 per cent when potassium was added with nitrogen and phosphate, but an increase of only 19 per cent occurred when nitrogen and phosphate were added alone.

Sparks points out that probably more phosphate and potassium are extracted by chemical soil tests than can be extracted by the plant itself, and this results in errors in interpretation of the fitness of the soil for growing crops.

"The quick-test methods of soil analysis are of value if results are interpreted correctly," Sparks says. "If soil tests are used to supplement information based on how well plants grow on that soil, then it is possible that a fertilizer formula can be worked out for given fields on the basis of soil analysis."

February Fertilizer Tag Sales

Fertilizer sales apparently are running at record high levels, as reflected by reports of fertilizer tax tag sales by state control officers to the National Fertilizer Association. Tag sales in February, in January-February and July-February were larger than in any preceding comparable periods. Farmers are being asked to expand acreage and to increase their production of seasonal important farm products so that we can ship vitally needed foodstuffs to supplement the scanty supplies in foreign lands. The increased use of fertilizer will help to make possible the accomplishment of this objective. Fertilizer consumption in the current year is more than one and a half times as large as it was in 1939. This very substantial expansion of production by the fertilizer industry has been a vital factor in the production records made by American agriculture.

Tag sales in the 17 states in February, as reported by the National Fertilizer Association, were equivalent to 1,506,000 tons, representing increases of 23 per cent over February, 1945, and 16 per cent over February, 1944. Increases over last year were widespread, with all of the 12 southern states and four of the five midwestern states reporting increases.

The very marked increase in February, combined with a more moderate increase in January, resulted in a 13 per cent rise in the two months combined over the corresponding period of last year. All of the southern states except Arkansas reported increases over the

(Continued on page 22)

FERTILIZER TAX TAG SALES
Compiled by the National Fertilizer Association

State	February				January–February		
	1946 Tons	1945 Tons	1944 Tons	% of 1945	1946 Tons	1945 Tons	1944 Tons
Virginia	86,517	69,370	75,825	114	167,227	147,056	142,399
North Carolina	304,396	267,507	241,507	113	598,361	529,922	497,570
South Carolina	171,320	147,430	160,995	107	331,209	309,048	315,353
Georgia	244,561	208,810	210,540	107	414,204	386,705	408,558
Florida	106,574	78,572	81,570	119	238,728	201,292	187,142
Alabama	193,150	147,250	154,050	103	316,450	307,000	307,650
Mississippi	93,200	59,852	81,395	106	150,400	141,917	165,395
Tennessee	57,919	44,791	46,397	126	83,371	66,375	67,685
Arkansas	27,600	11,200	35,800	86	41,500	48,400	55,158
Louisiana	38,900	21,550	33,550	107	67,360	62,811	65,150
Texas	40,625	19,770	41,627	143	92,287	64,380	59,527
Oklahoma	6,850	4,020	4,109	178	14,350	8,062	8,259
Total South	1,371,612	1,080,131	1,167,365	111	2,515,447	2,272,968	2,279,846
Indiana	39,753	39,506	65,266	148	122,976	83,056	89,955
Illinois	29,283	38,100	16,850	134	79,433	59,075	44,950
Kentucky	38,513	37,263	34,988	119	105,083	88,393	64,376
Missouri	20,532	20,481	9,984	155	73,619	47,509	46,946
Kansas	5,931	4,900	4,491	86	10,481	12,205	9,171
Total Midwest	134,012	140,250	131,579	135	391,592	290,238	255,398
Grand Total	1,505,624	1,220,381	1,298,944	113	2,907,039	2,563,206	2,535,244

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FERTILIZER MATERIALS - FEEDSTUFFS

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FERTILIZER MATERIALS MARKET

NEW YORK

Materials Situation Still Tight but Season's Fertilizer Supply Should Be Adequate. Export Inquiries Heavy. Possible Increase in Sulphate of Ammonia Ceiling. Potash Producers Advise Return of Allocation.

Exclusive Correspondence to "The American Fertilizer"

NEW YORK, March 18, 1946.

There has been no improvement during the past week in the supply position of the various basic fertilizer materials. However, in spite of the tight markets, producers are generally being able to meet agricultural demands for the current year's crops. Stocks of all materials are extremely low, and there is no indication of any surplus margins being built up during the 1946 fertilizer year.

Supplies of potash, superphosphate and other forms of agricultural nitrogen are holding up to prior expectations. Except for the loss of sulphate of ammonia and ammonia solutions as a result of the recent steel strike, nitrogen production has been about on schedule.

Inquiry for the export of all fertilizer materials remains heavy, but the only shipments actually moving to foreign consumers are being made through government channels. The outlook continues to be pessimistic for the early importation of potash, phosphate rock and various nitrogenous materials.

Sulphate of Ammonia

It is reported that steel operations have reached approximately 83 per cent of capacity, but shipments to fertilizer manufacturers continue to lag and current contracts have been cut by as much as 20 per cent. As a result of recent conference among industry members in Washington, it is rumored that the ceiling on ammonium sulphate may be raised in the near future.

Nitrate of Soda

March deliveries of nitrate of soda from Chile will probably be delayed several weeks. A recently settled stevedore strike in one of the larger Chilean ports brought about a delay in the loading of ships, and a consequent disruption of delivery schedules to this country.

Organic Materials

There are no new developments to be reported in this market, and new supplies continue to be practically impossible to obtain. There have been no offerings from foreign sources during the past period.

Superphosphate

Acidulators are still maintaining adequate production to meet the heavy demand in spite of increasing tightness in the phosphate rock market. It is reported that UNRRA is seeking around 20,000 tons of ordinary superphosphate for shipment to Europe, but it is not known at this writing whether definite contracts have been made.

Phosphate Rock

Producers are concerned about a possible boxcar shortage in the future. In view of the difficulty in obtaining new equipment and machinery parts, an immediate increase in production of phosphate rock cannot be looked for at present. There has been no movement of foreign material into this port up to the present time.

Potash

Fertilizer mixers are receiving full contract commitments, and production is being maintained at highest capacity. Excessive demand continues unabated, but remains unfilled. Members of the Potash Producers Industry Advisory Committee have recommended to the Civilian Production Administration that potash salts be put back under allocation until such time as the present abnormal demand decreases. Production in the German mines has steadily increased, but only up to a point sufficient to meet local needs. It is expected that operations will approach prewar levels in the near future. Conditions in the Russian potash industry are still unknown.

Moving to better farming land . .

As far back as the 1780's farmers were faced with the problem of lands exhausted and worn out by excessive cultivation. They found, as Thomas Jefferson said, "it was cheaper to buy a new acre than to fertilize an old one", and they moved on to the West, where more fertile soil could be found. For more than a hundred years this westward movement continued; families in prairie schooners left their worn-out farms and headed for more fertile regions.

What a contrast with today's modern farming in which farm lands, thanks to the development of fertilizers, grow in fertility and value year after year. Yes, industrial fertilizers have played a vital role in preserving the prosperity of American farms and helping develop the finest farming lands in the world.

The Raymond Bag Company is proud of the fact that leading producers, packers, and shippers of fertilizer specify Raymond Multi-Wall Paper Shipping Sacks for their packing and shipping requirements.

THE RAYMOND BAG COMPANY
MIDDLETOWN, OHIO

PHILADELPHIA

Fertilizer Sales at Top Levels. Sulphate of Ammonia Production Returning to Normal. Shortage of Sulphate of Potash Reported.

Exclusive Correspondence to "The American Fertilizer"

PHILADELPHIA, March 18, 1946.

Sales of mixed fertilizers and materials for direct application have been running at top levels, and while deliveries on earlier orders have been practically up to schedule, it is evident that the later orders will not be filled on time, and many buyers will be obliged to take what they can get, rather than what they want. Farmers have been asked to increase their acreage and output, and the fertilizer demand seems to indicate compliance.

Sulphate of Ammonia.—Production has been resumed after settlement of the strike which is said to be responsible for a loss of about 120,000 tons. Deliveries are accordingly much in arrears, but it is hoped that production will reach normal before the end of this month and much of the fertilizer demand will have been satisfied.

Nitrate of Soda.—The strike in Chile having thrown the shipping schedule back a full month, substantial arrivals are not expected before April and May, and the demand is much greater than can be supplied now.

Phosphate Rock.—Production is sold well ahead and, due to labor difficulties, there are practically no inventories. It is expected that for several months to come the demand will keep well ahead of the supply.

Superphosphate.—Production has materially increased but still cannot quite keep pace with the demand. This is due primarily to the short rock supply, since the sulphuric acid situation seems to be easier.

Potash.—Shipments of muriate have kept up well on contracts, but sulphate has not been in sufficient supply to match the demand. In fact, some mixers have taken to using carbonate of potash at much higher cost, rather than put muriate in certain brands. It has been proposed that potash be placed back under allocation until the present condition improves. We are assured, however, that the present known potash deposits in the United States are sufficient to last for several hundred years.

Dried Blood, Bone Meal, Tankage.—While a few cars have moved, this has been mostly to the feeding trade, as there is no supply of these organics available for fertilizer use.

Castor Pomace.—There has been some movement, but the demand is overwhelmingly in excess of the supply.

CHICAGO

Order M-390 Working Hardship in Fertilizer Production. Organics Still Scarce. Critical Shortage of Feed Materials.

Exclusive Correspondence to "The American Fertilizer"

CHICAGO, March 18, 1946.

There has been much opposition by the fertilizer industry to order M-390, which prohibits use of chrome leather stock in the manufacture of nitrogenous tankage. Food production apparently is of paramount importance at present and this order will certainly reduce the amount of fertilizer that can be used toward producing the required amount of food. On the assumption that fertilizer manufacturers derive 10 per cent of the nitrogen in their mixtures from organic sources, the production of just one midwestern plant, affected by order M-390, would reduce the supply of organic nitrogen required for fully 500,000 tons of fertilizer.

In the meantime the market remains at a standstill because of lack of offerings. Quotations, if made at all, are unchanged at ceiling prices. Bartering has now appeared in this market, as offerings of grain have been made in exchange for mixed fertilizers.

In the feed line there is critical shortage in

Manufacturers' Sales Agents for **DOMESTIC**

Sulphate of Ammonia

Ammonia Liquor :: Anhydrous Ammonia

HYDROCARBON PRODUCTS CO., INC.

500 Fifth Avenue, New York

wet and dry rendered tankage and scattered offerings are quickly absorbed at ceiling prices.

Ceiling prices are:

High grade ground fertilizer tankage, $3.85 to $4.00 ($4.68 to $4.86 per unit N) and 10 cents; standard grades crushed feeding tankage, $5.53 per unit ammonia ($6.72 per unit N); blood, $5.53 ($6.72 per unit N); dry rendered tankage, $1.25 per unit of protein, f. o. b. producing points.

CHARLESTON

Fertilizer Shipments Ahead of Last Season. Nitrate of Soda Imports Delayed by Strike. Phosphate Rock Market Tight.

Exclusive Correspondence to "The American Fertilizer"

CHARLESTON, March 18, 1946.

Shipments of mixed fertilizers have become quite heavy and are considerably ahead of the same time March, 1945.

Organics.—Due to the shortage of these materials, some of the manufacturers have had to reduce the organic guarantee in mixed goods.

Sulphate of Ammonia.—It is rumored now that, on account of the higher costs caused by the steel strikes, some advance in the price of ammonium sulphate may be authorized, with the possibility of this advance being $5.00 per ton.

Chilean Nitrate of Soda.—Shipments of nitrate of soda are delayed on account of the strikes in Chile a few weeks ago.

Blood.—The nominal market on this is still $5.53 per unit of ammonia ($6.72 per unit N), f. o. b. producing plant, with practically no offerings. South American blood has recently been quoted as high as $8.95 per unit of ammonia ($10.88 per unit N) C&F but cannot be brought in on account of the ceilings.

Phosphate Rock.—Shipments have about cleaned up most of the rock already mined and the producers have to depend upon what is currently produced.

Ordnance Department to Supply More Fertilizer Nitrogen

The Ordnance Department is currently producing 4,000 tons of anhydrous ammonia per month for use in fertilizer production. This quota will shortly be raised to 8,000 tons per month. Three plants have been assigned to this production: Buckeye Ordnance Works, Ironton, Ohio; Jayhawk Ordnance Works, Pittsburg, Kans.; Ozark Ordnance Works, El Dorado, Ark. The output

CASE HISTORY No. 3

In a series of factual experiences of a group of American manufacturers with Multiwall Paper Bags.

COST COMPARISON

	100 lb. Osnaburg	100 lb. Paper Bags
Container Cost	.150	.068
Container Cost per 100 lbs.	.150	.068
Labor Cost	.014	.006
Total Cost per 100 lbs.	.164	.074
Savings per 100 lbs. Paper over Fabric		.090
Saving per ton Paper over Fabric		1.80

DETAILS OF LABOR COST

	Production per hour	Cost Per 100 lbs.
100 lbs. Osnaburg		
8 men filling		
6 men weighing, closing, and handling (average wage rate 60c per hour)	60,000 lbs.	.014
100 lb. Paper (6 valve bag Packers)		
6 men filling		
6 men handling (average wage rate 60c per hour)	120,000 lbs.	.006

CLASS OF PRODUCT PACKED

CEMENT	FERTILIZER
CHEMICALS ✓	FOOD
FEEDSTUFFS	MISCELLANEOUS

PRODUCT CHARACTERISTICS

ABRASIVE ✓	GRANULAR ✓
CORROSIVE	HEAVY ✓
DELIQUESCENT	HYGROSCOPIC
FLUFFY	LIGHT
FREE-FLOWING ✓	VISCOUS

ST. REGIS BAG PACKAGING SYSTEMS are made in a variety of capacities, speed, and manpower requirements to suit specific products and plant layouts. Machines are available in types to meet the special characteristics of a wide range of products, with filling speeds as high as twenty-four 100-lb. bags per minute — with one operator.

BRIGHT LIGHT AT A DARK MOMENT

Stone Mountain Grit Co., Lithonia, Ga., faced with heavy demand for grit to increase egg production, was bottle-necked by slow packaging and a severe shortage of osnaburg bags. With a packaging crew of 14 men, production averaged only 150 one hundred lb. bags per hour from each of 4 spouts — a total of 600 bags per hour. 6 St. Regis packers to fill multiwall paper bags were installed, and operated in pairs. With a crew of 12 instead of 14 men, production went up to 200 bags per hour per machine — a total of 1200 bags per hour . . . from 60,000 to 120,000 lbs. per hour.

Production Per Man Hour More Than Doubled

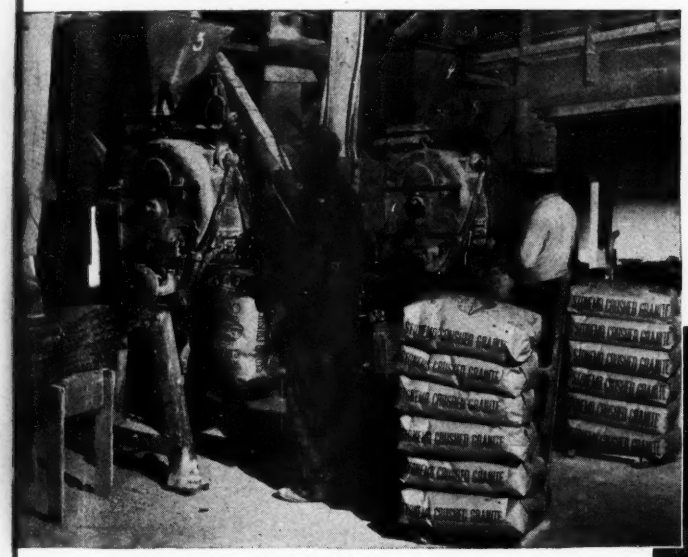
With the St. Regis system, 12 men packed 120,000 lbs. per hour, or 10,000 lbs. per man hour; equivalent to 130% increase of output per man hour, and easier and pleasanter jobs for the entire crew.

Container Costs More Than Halved

The hard-to-get osnaburg bags cost him $150 per thousand. Multiwall paper valve bags cost him $68.40 per thousand. His container costs were reduced by 54.6%.

Consumer Acceptance

Sift-proof paper valve bags assured dust-free, full weight containers which customers readily accepted in place of the former fabric containers.



(Left) A pair of the St. Regis packers in the Stone Mountain Grit Co. plant at Lithonia, Ga.

(Below) Sift-proof Multiwall paper bags are handled easily.

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Without obligation, please send me full details regarding "Case History" No. 3, outlined above.

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COMPANY_____

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of the two latter plants, which are operated by the Ordnance Department, is being marketed by the DuPont organization and the Barrett Division of Allied Chemical & Dye Corporation, without cost to the government. The Buckeye plant is being operated under lease by the Atmospheric Nitrogen Corporation.

Chase Bag Co. Erects New Minneapolis Plant

F. H. Ludington, president of Chase Bag Company, has announced the sale of their large factory building at 700 Washington Avenue, North, Minneapolis, Minn., to the Gamble-Skogmo Company. Mr. Ludington further announced that Chase Bag Company will erect a new modern bag plant on Washington Avenue, North, at 38th Street. The new one-story building, which will be ideally suited to bag manufacturing, will contain approximately 160,000 square feet of floor space. It will border on the Mississippi River.

Dr. Smith Joins Position Securing Bureau

Dr. Arthur M. Smith, for many years vice-president and technical director of Synthetic Nitrogen Products Corp., and well-known plant nutrition specialist, has joined Position Securing Bureau, Inc., 45 John Street, New York 7, N. Y., as placement manager in charge of the Chemical Department. Dr. Smith's work is the matching of applicants' qualifications to meet employers' specifications. Positions in production, research, and technical sales for chemists, chemical engineers, and workers in other related sciences are filled through Dr. Smith's department. He is qualified for his new work by many years' experience in teaching, research and industry.

Maryland Fertilizer Tonnage for 1945

According to figures compiled by L. E. Bopst, state chemist, the tonnage of fertilizers used in Maryland during 1945 was the largest on record. During the year, 218,144 tons were sold in that state, compared with 207,485 tons in 1944. Once again the 3–12–6 grade proved most popular with sales of 87,852 tons. Other leading grades were: 4–8–12, 23,377 tons; 6–8–6, 14,389 tons; 5–10–5, 14,103 tons; 4–12–8, 13,339 tons.

Forty-one different grades of mixed fertilizers were registered but only one contained less than 20 units of plant food and this had sales of only 147 tons. Mixed fertilizer tonnage amounted to 189,061 tons, with an average analysis of 3.4—10.8—7.5. It is interesting to note that in 1917 and 1918 the grade having the largest sale was 1–8–1, containing less than half the plant food of the 1945 leader.

Potash Reserves Considered Adequate for 200 Years

Potential and developed potash reserves in the United States are of such magnitude that, with a reasonable rate of exploration and development, there is no foreseeable shortage of supplies for agriculture and industry for hundreds of years, the consulting mining engineering firm of Behre & Dolbear & Co. declared in a report prepared for the American Potash Institute and made public March 8th.

In sharp contrast to warnings of the Department of Agriculture, that the known deposits will be exhausted within 50 to 100 years, and therefore should be conserved as strategic reserves to be operated only in time of need, the report said that at the rate of consumption and imports prevailing for the years 1935–39, the known developed reserves

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MILORGANITE

Specializing

Nitrogenous Materials

Blood and Fertilizer Tankage

Phosphate Rock

Bone Meals

Dolomitic Lime

(42—44% Magnesium Carbonate)

SOUTH AMERICAN DRY RENDERED TANKAGE

PEOPLES OFFICE BUILDING
Charleston, S. C.

Keyed SERVICE!

Fertilizer plants all over the country—large and small—state their needs and we meet them. Large stocks of seasoned materials and ample modern production facilities enable us to make prompt shipments.

TRIPLE SUPERPHOSPHATE

46 to 48% Available Phosphoric Acid

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We also manufacture

HIGH-GRADE SUPERPHOSPHATE

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AMERICAN POTASH and CHEMICAL CORPORATION

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Pioneer Producers of Muriate in America

Branch Offices

214 Walton Building
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609 South Grand Avenue
LOS ANGELES 14, CALIF.

MURIATE and SULPHATE of POTASH

Plant foods are urgently needed to grow the crops which feed our nation and our armed forces.

Our plant at Trona, Calif., is operating at capacity to provide supplies of these essential plant foods, and other materials needed in the national effort.

Manufacturers of Three Elephant Borax and Boric Acid

See page 29

in present active operations would last for more than 200 years.

The firm based its estimate on available government reports, of engineers engaged in the industry and supplemented by field investigations in the producing areas of New Mexico and California.

In its tabulations of the proved and strategic potash reserves, the report lists 107,000,000 tons of K_2O from brines and highly soluble salts, 252,000 tons from soluble salts not now in production, and 858,000,000 tons from insoluble sources such as greensand and Georgia and Wyoming shales. This last source cannot be considered at the present time as no commercially feasible process has yet been developed to produce an available form of potash for agricultural use.

A Simple Method for Figuring Fertilizer Applications

Nowadays, many agricultural experiment stations are recommending applications of plant food in terms of pounds of N, P_2O_5, or K_2O per acre. This is particularly true in the case of top-dressing, where the recommendation calls for so many pounds of nitrogen. As more and more materials of varying analysis become available for fertilizer use, a simple formula for estimating the number of pounds of material needed to supply a given amount of any plant food has been devised.

This is done by multiplying the desired number of pounds of N, P_2O_5, or K_2O by 100 and dividing by the analysis of the material to be used. For example, if we want to know the number of pounds of ammonium nitrate, analyzing 32 per cent N, which would be needed to supply 25 pounds of nitrogen per acre, the figuring is as follows:

$25 \times 100 = 2500 \qquad 2500 \div 32 = 78.125$

which shows that $78\frac{1}{8}$ pounds of ammonium nitrate per acre will be needed.

On the other hand, if we know the quantity of material to be applied and wish to find out the number of pounds of plant food which it will supply, we divide the number of pounds of the material by 100 and then multiply by the analysis of the material. For example, 180 pounds of nitrate of soda, analyzing 16 per cent N will supply how much nitrogen?

$180 \div 100 = 1.8 \qquad 1.8 \times 16 = 28.8$

Therefore, 180 pound of nitrate of soda will furnish 28.8 pounds of nitrogen.

CLASSIFIED ADVERTISEMENTS

Advertisements for sale of plants, machinery, etc., and for help and employment in this column, same type as now used, 60 cents per line, each insertion.

WANTED to purchase—outright or controlling interest in going fertilizer business. Address "170," care THE AMERICAN FERTILIZER, Philadelphia 7.

FOR SALE

FOR SALE—Two dry mix fertilizer plants, best East Texas locations. Now running, will deliver in June. PITTSBURG COTTON OIL CO., Pittsburg, Texas

THE ideal conveyors for your plant can be delivered promptly. Bag and box pilers, long horizontal, floor to floor, and special models. Pre-war prices—$495.00 up. 20-ton 24 x 10 foot Truck Scale—$575.00. 30-ton 34 x 10 foot Truck Scale—$1,040.00. 30-ton 40 x 10 foot Truck Scale—$1,490.00. Write for folder Bonded Scale Company, 25 Bellview, Columbus 7. Ohio.

FEBRUARY TAG SALES

(Continued from page 14)

two month period. In the midwest, increases were reported by four of the five states.

Statistics on tag sales in the fertilizer year, starting with July, have become of increasing importance with the accelerated practice of early buying. An increasingly large proportion of tag sales has been made in the latter months of the preceding calendar year for use in the current year. Consequently calendar year statistics are of diminishing importance as an indication of fertilizer consumption in the calendar year.

In addition to the increased demand for fertilizer resulting from the large crop production goals, economic factors have been favorable to a greater use of fertilizer. These include, particularly, the peak income of farmers and the favorable relationship of prices received by farmers for their products to the price paid by them for fertilizer.

STEDMAN FERTILIZER PLANT EQUIPMENT
Dependable for more than 50 Years
All-Steel Self-Contained Fertilizer Mixing Units
Batch Mixers—Dry Batching
Pan Mixers—Wet Mixing
Swing Hammer and Cage Type Tailings Pulverizers
Vibrating Screens
Dust Weigh Hoppers
Acid Weigh Scales
STEDMAN'S FOUNDRY & MACHINE WORKS AURORA, INDIANA, U.S.A. Founded 1834

PLANTING A NATION'S DIET

To a large extent, the diet of the whole nation depends upon the farmer. A well-rounded dinner table of vegetables, beef and dairy products is the result of his knowledge of the soil, plus hard work and experiments with improved farming methods. The use of your fertilizers—most of them compounded with potash—has helped the farmers accomplish this job. Potash is a vital soil nutrient which increases soil fertility and provides greater resistance to disease and drought.

Sunshine State Potash will continue to help the farmers provide an abundant diet for the nation's table.

HIGRADE MURIATE OF POTASH 62/63% K_2O

GRANULAR MURIATE OF POTASH 48/52% K_2O

MANURE SALTS 22/26% K_2O

SUNSHINE STATE POTASH — PRODUCT OF NEW MEXICO U.S.A.

Reg. U. S. Pat. Off.

UNITED STATES POTASH COMPANY

Incorporated

30 Rockefeller Plaza, New York 20, N. Y.

Fertilizer Boosts Missouri Tomato Yields

Tomato growers in Missouri found during the past year that their production increased with the use of fertilizer. Results show that not only larger tomato crops but also better quality tomatoes were grown.

In Barry County, Truman Cole planted tomatoes on ground that had been in red clover in 1944. Mr. Cole harvested 23,423 pounds of tomatoes to the acre where 666 pounds of 3–12–12 fertilizer had been applied. The yield was 9,973 pounds more than was picked from the check plot.

Edgar Lawson of Christian County produced tomatoes on ground that previously had been in alfalfa. His fertilizer application was 575 pounds of 7–9–7 plowed under and 250 pounds of 4–12–4 side dressed. His yield of 18,270 pounds was 5,954 pounds of tomatoes more than the amount harvested from the unfertilized check plot.

Another demonstration was conducted on the Perry Dean farm in Stone County on land that had not been in legumes. Mr. Dean used 12 tons of manure and 300 pounds of 0–20–0 on one plot. He harvested 12,847 pounds from the treated plot. This was 11,133 pounds more than a check plot yielded.

Carl Johnson of Lawrence County harvested 18,456 pounds of tomatoes per acre where 603 pounds of 3–12–12 was plowed under and 150 pounds of 2–12–6 was used as a side dressing. The fertilized plot yielded 12,456 pounds more than the check plot. The tomatoes on the fertilized areas were earlier, according to Mr. Johnson. The cannery, where the tomatoes were marketed, reported the quality was better, and the tomatoes weighed four to six pounds more per crate than other tomatoes receiving only a small amount of fertilizer.

On the Newton County farm of John Ferguson 850 pounds of 8–8–8 and 200 pounds of 4–12–4, used as a side dressing, were applied to a tomato plot. The increased yield above the check plot was slightly more than three tons. The cost of the fertilizer was approximately $21 and the value of the extra tomatoes was $85. The return was $4 for every dollar invested in fertilizers, according to Mr. Ferguson.

On January 1st the name of L. C. Manry Company, fertilizer manufacturers of Edison, Ga., was changed to Fidelity Products Company.

FERTILIZERS AND SOIL CONSERVATION

(Continued from page 11)

much more fertilizer in growing strong sod crops.

I am among those who believe strongly in the value of organic matter as a soil amendment, but I would not make a fetish of it as do some others. Some of the literature on organic matter now being distributed in the East is positively mischievous because it is so one-sided. The oldest agricultural experiment station in the world, Rothamsted in England, as well as many in other countries, have conclusively shown the value of fertilizers, but some of the extreme advocates of organic matter strongly condemn the use of commercial fertilizers. Many of these enthusiasts are well-meaning but not well-informed; others know better but have something to sell. Along with the enthusiasm for new theories and practices, many of them good and sound, may we not have moderation and sanity?

New England farmers need to use much more fertilizer than they are now using if they are to realize a sound program of land use and soil conservation. Fertilizer consumption in New England in 1944 was 462,322

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Loading and Discharging Ships
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Room 606
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BASING, MIXING & BAGGING UNITS
COMPLETE FERTILIZER PLANTS
THE A.J. SACKETT & SONS CO.
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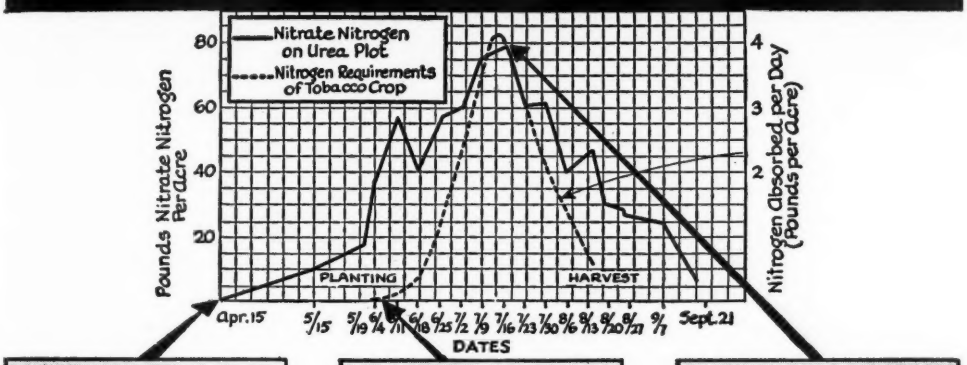
Here's a new curve in tobacco growing!



UREA NITROGEN on the tobacco plot turned into nitrate nitrogen like this.

TOBACCO PLANTS began absorbing nitrogen like this—took up ⅓ of the total in 10-day peak.

"UREA PRODUCED nitrates more in accord with the plant's requirements than did any of the other sources."**

** Connecticut Experiment Station

Your fertilizer fits the crop when you use Urea Nitrogen

Urea Nitrogen in your fertilizer is converted to nitrate nitrogen according to the needs of tobacco plants. Because of the chemical changes it undergoes in the soil, it resists leaching until it is nitrified by soil micro-organisms and made available to the growing plants.

Du Pont UREA-AMMONIA LIQUORS are an excellent source of urea nitrogen. They're low in cost, easy to handle and produce quick-curing mixtures that store well and drill well.

Du Pont urea nitrogen is available in four different UREA-AMMONIA LIQUORS and URAMON Fertilizer Compound. For further information, write E. I. du Pont de Nemours & Co. (Inc.), Ammonia Department, Wilmington 98, Delaware.

NITROGEN THAT FITS THE CROP

DU PONT UREA NITROGEN { UREA-AMMONIA LIQUORS • URAMON REG U.S. PAT. OFF. Fertilizer Compound

DU PONT REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

tons of which 55,722 came from the Government. This total is about one-third greater than the average consumption from 1925 to 1934. Comparable figures for Massachusetts show about a 50 per cent increase. The indication is that fertilizer consumption in this area is, as has been pointed out for other areas, largely dependent on the farmers' income. The New England area could easily consume to advantage twice the 1925–34 average consumption, and will if the price of fertilizer and the income are right.

More Fertilizers for Dairy Farming

The great undeveloped market for fertilizer in New England is dairy farming, which is the principal agricultural enterprise of the area. Cash crop farmers of this area generally use fertilizers in abundant amounts, one to one and one-half tons per acre being common applications. The job of cash crop farmers is more one of conservation than application of fertilizer. Dairy farmers, on the other hand, are generally sparing users of fertilizers. Some depend entirely on manure for fertility, some use only lime and superphosphate supplements, others use commercial fertilizers sparingly for corn and grassland, and a few are following an adequate or nearly adequate program.

The average dairy farmer thinks little or nothing of spending $70 to $80 per cow per year for grain, yet shrinks from the thought of spending $15 to $20 per cow for fertilizer. Professor Ralph Donaldson of the Massachusetts Extension Service tells me that economic production of forage requires an expenditure of about $10 per acre or $20 per cow for fertilizer. This is not an unreasonable expenditure when the importance of forage is considered. Cows are by nature forage-consuming animals and will consume large quantities if the quality is good. Forage is supposed to supply about two-thirds of the cow's nutriment; actually in New England it furnishes about one-half. The New England fertilizer bill for 1944 was around $18,000,000. Dairy farms probably consumed not more than one-third of the total, most of it being used for potatoes, market garden crops, fruit, tobacco, onions and other cash crops. New England has about 700,000 cows. If a minimum of $20 per cow were spent on fertilizer for forage production, dairy farms would consume fertilizer valued at least at $14,000,000. Vermont, the "dairyest" of the New England states, has about 260,000 cows, and if fertilizers were applied as recommended the investment would be $5,200,000, whereas Vermont's fertilizer bill in 1944 was not over $1,500,000.

The increased use of fertilizer and lime on dairy farms is in the interest of soil conservation because these amendments produce a stronger, denser sod. Grass is one of the soil's best protective covers. In the words of John J. Ingalls, a native of Massachusetts, by the way, "Its tenacious fibers hold the earth in its place and prevent its soluble components from washing into the wasting sea." New England soils are not, as some have said, natural grasslands. The natural climax of this area is forest, and that is what the first settlers found. But by the correct use of soil amendments, including commercial fertilizers, some of our farmers have produced some of the best grasslands in the world. The New England climate is excellent for grass production, though not the best. But it should be realized that some of our soil types, particularly the outwash sandy, gravelly sandy soils, are so poorly adapted to grasses that it is not considered sound economy to try to convert them into good grasslands.

In conclusion I should like to refer briefly to our trials of different types of vegetation suitable for conserving sandy soils of no or, at least, low agricultural value. Of the grasses tried, weeping love grass (Eragrostis curvula) a species originally introduced from South Africa, is the most promising. We have had some success with birdsfoot trefoil, and a little success with kudzu, but all the forms of vegetation tried on these poor soils require more or less fertilizer for adequate growth.

In this paper I have tried to show that the soils of New England are naturally deficient in certain nutrient elements needed by crops, that exploitative farming has caused deterioration, and that judicious use of fertilizers is in the interest of a sound program of soil conservation, soil improvement, and maintenance of soil fertility.

"Just look at the locations of those six Bemis Multiwall plants!"

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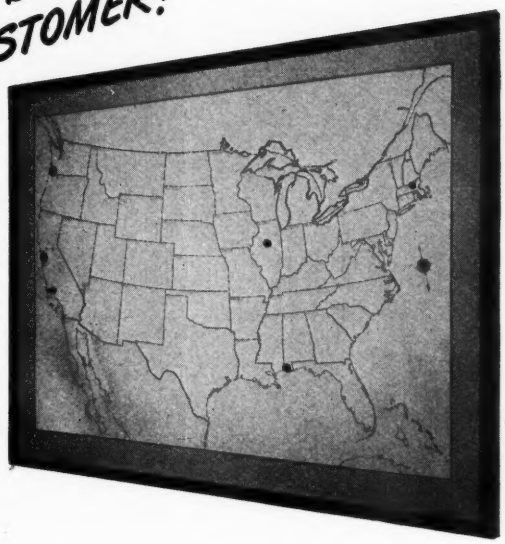

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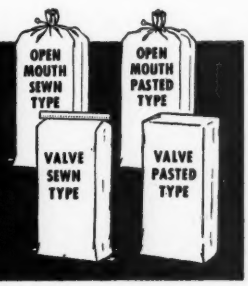


HOPEWELL NITROGEN FOR PEACE, PROTECTION AND PROSPERITY

(Continued from page 10)

antioxidants to prolong the life of lubricating oils. All of these additives are of direct economic and military importance. By way of example, until recently submarines could travel only from San Francisco to Pearl Harbor without changing engine oil. With the new improved lubricants, submarines have traveled more than twice the distance on a single change of oil.

Lifesaving Chemicals

In the fight against infection doctors and scientists are winning a great succession of victories that have not ended with the war. Two of their most amazing and effective weapons in this fight are lifesaving penicillin and the "sulfa" drugs.

It has been reported that American industry is producing penicillin at the prodigious rate of more than 500,000,000,000 units a month which is sufficient for millions of individual treatments. Although this monthly penicillin production is equivalent to only 700 pounds, large plants are employed and vast quantities of raw materials are needed, including Hopewell sodium nitrate and ammonia.

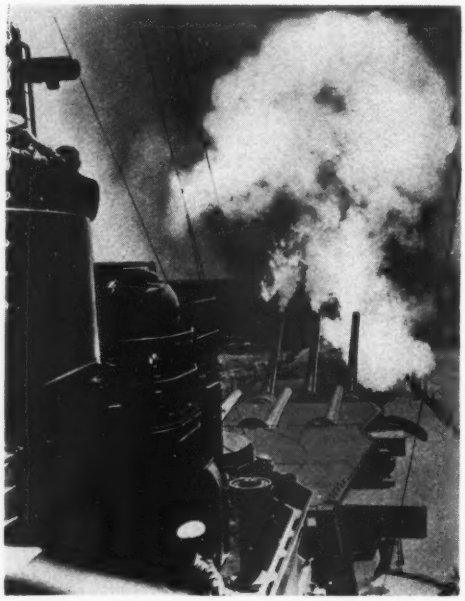
The sulfa drugs, sulfanilamide, sulfathiazole, sulfadiazine and others are all nitrogen products and require derivatives of ammonia in their manufacture. In fact, a great number of the other drugs and medicinals, including atabrin for malaria prevention, are nitrogen products.

The nitrogen of ammonia also contributes to America's vim, vigor and victory through helping to supply the pep element in vitamins. Ammonia and chlorine are essentials in the production of such vitamins as the B complex group so necessary in the maintenance of health. Newspapers tell us that last year more than a hundred tank cars of both ammonia and chlorine were used in the manufacture of vitamins.

Of corrollary importance in the fight against disease is the use of ammonia and chlorine in making water safe to drink, and in manufacture of new insecticides, such as D. D. T., to destroy air-borne and crawling insects.

New Products

When the Japanese overran Malaya and the Netherland East Indies, America lost the source of 90 per cent of its tin. Thus it became imperative that every pound of this essential metal be recovered again and again. To facilitate this recovery, Solvay manufactured a new product, oxidizing salt solution, which makes available for reuse the film of tin on the tin cans from our scrap drives. The iron in the detinned cans is then converted to iron powders with the aid of Hopewell ammonia.



A salvo from the big 16-inch guns of the U.S.S. North Carolina shown in the picture consumes nitrogen sufficient to grow nearly 1000 bushels of corn

At the Hopewell plant other new products have been developed to meet special wartime needs. Two of these, nitrogen tetroxide

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SPECIFY

THREE ELEPHANT

. . . . WHEN BORON IS NEEDED TO CORRECT A DEFICIENCY OF THIS IMPORTANT SECONDARY ELEMENT

Agricultural authorities have shown that a lack of Boron in the soil can result in deficiency diseases which seriously impair the yield and quality of crops.

When Boron deficiencies are found, follow the recommendations of local County Agents or State Experiment Stations.

Information and references available on request.

AMERICAN POTASH & CHEMICAL CORPORATION

122 East 42nd ST., NEW YORK CITY

Pioneer Producers of Muriate of Potash in America

See Page 21

and nitrosyl chloride, are highly reactive chemical raw materials which possess many potential peacetime applications. The availability of nitrogen tetroxide made possible the manufacture from cellulose of a soluble dressing, which, when applied to a wound, stops the flow of blood. In surgery this material can be closed over and left in the body as an internal dressing which is slowly absorbed.

In the field of synthetic organic chemicals Solvay has introduced "Nytron," a super cleaner of the type used around the world by the Navy as slat water soap and by the Army in mobile laundry units. Another wartime product from Solvay laboratories, alkenyl succinic acid anhydride, is useful in making vitally needed special lubricants, plastics, lacquers, insecticides and fungicides.

The increasing activity of research at the Hopewell plant, together with the expansion into new laboratory facilities, is one indication of the forward plans of Solvay and Barrett in the fertilizer and chemical fields.

Corn Does Better When Nitrogen is Applied in Time

On many farms in West Virginia, large increases in corn yields can be expected if enough nitrogen is put on the land. Experiments by the Department of Agronomy at the College of Agriculture, West Virginia University, bear out this statement, according to E. H. Tyner, associate agronomist in the department. In fact, he says, increases as much as 30 bushels to the acre have been secured.

One of the reasons for the usual low to average corn yields in the state, Tyner points out, is not enough fertilizing with nitrogen. Cheaper nitrogen and higher corn prices indicate that more nitrogen could be used with profit.

How much organic matter is in the soil, and what rotation is used, will determine how well the soil will respond to nitrogen. More of this fertilizer is needed where timothy sods are broken for corn than where a clover sod is broken. Growers are advised to try this on a few acres to observe the difference.

The agronomist states that either 10–10–10 (500 pounds per acre), 8–8–8 (600 pounds), or 7–7–7 (700 pounds) fertilizer can be used. Since these are heavy applications the fertilizer should be drilled on the sod and plowed under. With this method there is no danger of fertilizer burn. Then, in addition, at corn-planting time, the usual application of 4–12–4 in the hill is recommended.

One advantage of plowing under, according to Tyner, is that the fertilizer is placed deep. That's where most of the roots are, and that's where moisture is present. Besides, plowing under will encourage deep rooting, so that the corn is better able to withstand drouths.

Orchard Fertilizer Deficiencies

Dr. J. K. Shaw, Massachusetts Experiment Station, describes deficiency symptoms of apples as follows:

Nitrogen shortage is indicated by light green or yellowish-green leaves.

Potassium shortage results in a dying of the leaf tissue at the point and at the edges of the leaf, much like spray injury except that it has a grayish color. Potassium does affect the tree visibly and a shortage does exist in some orchards.

Magnesium shortage is indicated by the death of leaf tissue between the veins. That part of the older, lower leaves will turn yellowish by midsummer. As it progresses the leaves drop until in severe cases there are not many leaves left except at the ends of the terminal growth. It causes apples to drop badly.

In sod orchards it is known that a nitrogen application is needed every year. To be sure the trees get it, ring fertilize the trees with quickly available nitrogen each spring. Surface-feeding crops like the grasses are the first to show deficiencies of potassium and phosphorus. As long as grass is growing luxuriantly in an orchard the soil must be well supplied with these elements. When the grass begins to get thin and weedy, broadcast a recommended complete fertilizer.

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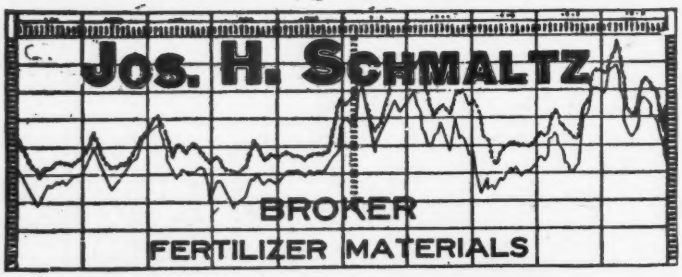

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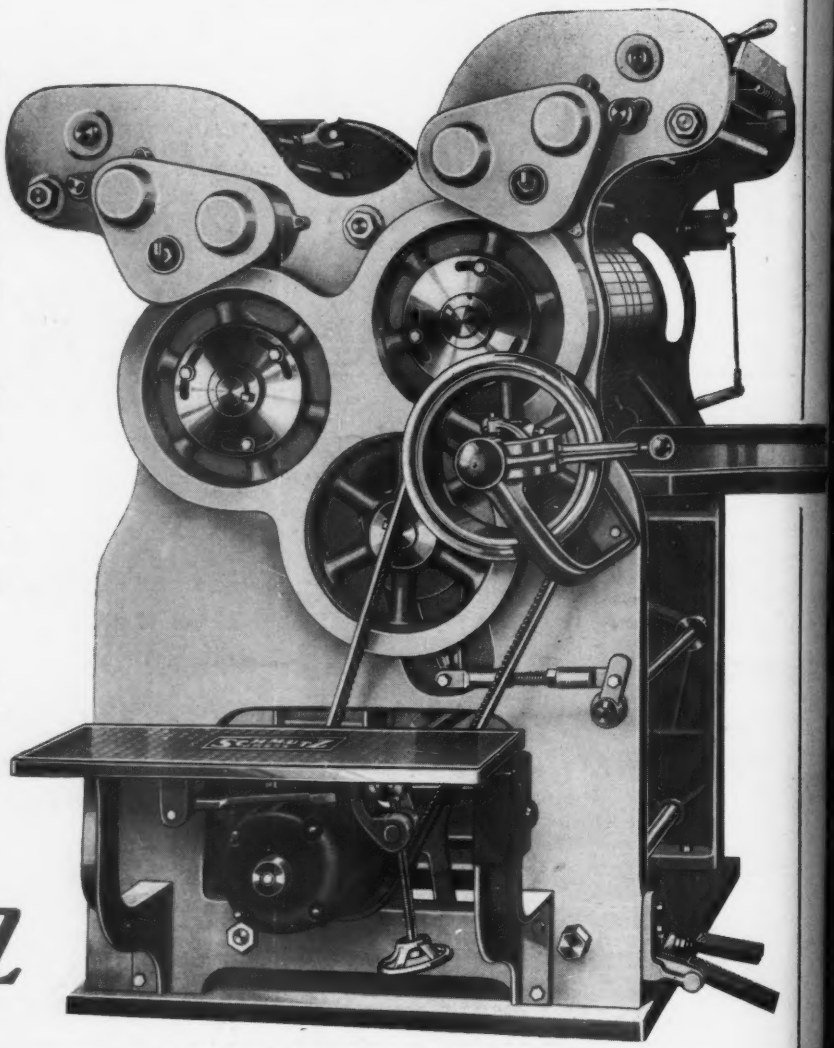

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